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**TENTATIVE SPECIFICATION  
FOR  
TWO COAT BITUMINOUS  
SURFACE DRESSING**



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## **TENTATIVE SPECIFICATION FOR TWO COAT BITUMINOUS SURFACE DRESSING**

### **1. INTRODUCTION**

The draft tentative specification for two coat bituminous surface dressing prepared by the Bituminous Pavements Committee of the Indian Roads Congress was approved by the Executive Committee at their meeting held on the 20th August, 1966 and was later approved for publication as the finalised tentative specification by the Council of the Indian Roads Congress at their 65th meeting held at Trivandrum on the 3rd September, 1966.

This tentative specification is intended to indicate what is considered to be a good practice for construction of two coat bituminous surface dressing under average conditions.

Provision of this specification shall apply unless modified by special provisions to take into account unusual conditions.

### **2. DESCRIPTION**

The work covered by this specification consists of application of two coats of surface dressing on previously prepared base coat of pavement. Each coat consists of a single application of bituminous material covered with one application of cover material of size as in Clause 3.2.3.

### **3. MATERIALS**

#### **3.1. Bituminous Materials**

The bituminous materials shall conform to the requirements as specified and provided for in the proposal and satisfy the related specifications issued by the Indian Standards Institution (*vide* I.S.I. Standards 73, 215, 217 and 454). The grades of binders to be used would depend upon the climatic conditions.

### 3.2. Cover Material

3.2.1. **General requirements :** The cover material shall consist of crushed stone, crushed slag, crushed gravel (shingle) or other crushed stones, as specified, and shall have clean, strong, durable, and fairly cubical fragments free from disintegrated pieces, salt, alkali, vegetable matter, dust and adherent coatings. In case crushed gravel is not available at reasonable cost, rounded gravel (shingle) or water borne shingle may be used.

The aggregate shall preferably be hydrophobic in nature and of low porosity. The water absorption shall not ordinarily exceed one per cent.

3.2.2. **Physical requirements :** The aggregate shall satisfy the following physical requirements :

Los Angeles Abrasion value	—not exceeding	35
or Aggregate Impact value	—not exceeding	30
Soundness, per cent loss with sodium sulphate for five cycles	—maximum	12
Flakiness index, per cent	—maximum	25
Water absorption—	not exceeding	1 per cent
Weight per cubic metre in the case of blast furnace slag	—minimum	1120 kg
Stripping test (CRRI)*	—maximum	25 per cent

\*Two hundred gm of 18 mm to 12 mm aggregate and binder are mixed together in a small casarol, binder being heated previously to 160° C (if bitumen) and 110° C (if tar). The mixture is transferred to a 500 ml beaker and allowed to cure at the room temperature for about 2 hours. Then  $\frac{3}{4}$  of the volume of beaker is filled with distilled water and the beaker is kept in a water bath maintained at 40° C, taking care that the level of water in the water bath comes upto at least half the height of the beaker. The beaker is covered with a glass plate. After the expiry of 24 hours, the beaker is taken out of the water bath and visual examination is carried out to estimate the quantity of stripping that takes place and it is expressed as percentage of the uncovered area to the total area of the aggregates. The whole test is repeated a second time and an average value is obtained.

Where all these conditions cannot be satisfied, it is left to the Engineer-in-charge to allow reasonable tolerances.

3.2.3. **Size :** The size of chippings to be used shall depend on whether the treatment is for the first coat or for the second coat and shall be as per the size specified below. For single application of the aggregate, it is desirable to keep to the grading of the sizes specified in Table 1.

TABLE I. REQUIREMENTS FOR GRADATION OF AGGREGATES

Sieve designation nominal size of aggregate	Specification
I. For first coat 13.2 mm	Passing through 22.4 mm square mesh sieve and retained on 11.2 mm square mesh sieve.
II. For second coat 11.2 mm	Passing through 13.2 mm square mesh sieve and retained on 5.6 mm square mesh sieve.

*Note :* It is essential to screen the aggregate through proper size sieves to ensure the size stipulated in the specification.

### 4. CONSTRUCTION METHODS

#### 4.1. Weather and Seasonal Limitations

Preferably, the surface dressing work shall be carried out only when the atmospheric temperature in shade is 16° C or above. No bituminous material shall normally be applied when the surface or the cover material is damp or when the weather is foggy or rainy or during duststorm. However, in case of use of bitumen emulsion as binder, the surface should be slightly damp.

#### 4.2. Arrangements of Traffic

The road to be treated shall be closed in length equal to one day's work. Suitable diversions shall be made to divert the traffic. Adequate arrangements of barriers, flags, diversionary signs, warning red lights, etc., shall be made for the convenience and safety of

traffic. All diversions shall be kept watered so as to prevent dust going on the cleaned or painted surface.

#### 4.3. Preparation of Road Surface

The underlying course on which surface dressing is to be laid shall be prepared, shaped and conditioned to a uniform grade and section as specified. Any depressions or pot-holes shall be properly made up and thoroughly compacted sufficiently in advance. The defective parts shall be clearly cut out and then properly patched with new material.

Where the existing surface shows signs of "fatting-up", such position should be rectified.

It is important that the surface be dry and thoroughly cleaned of caked earth and other foreign matter immediately before applying the binder. The surface should be cleaned first with hard brushes, then with softer brushes and finally blowing off with sacks or gunny bags to remove the fine dust. If the base to be treated consists of stabilised soil or of porous aggregate, a suitable bituminous primer may be applied at the rate of 7.3 to 14.6 kg per 10 m<sup>2</sup> as specified in the Indian Roads Congress Tentative Specification for Priming of Base Course with Bituminous Primers.

If the base to be covered by the surface treatment is an old bituminous surfacing, it shall be swept clean, free from sand, dirt, dust and other loose deleterious foreign matter, by means of mechanical sweepers and blowers, if available, supplemented by hand brooms where necessary or by means of wire brushes, small picks, brass brooms, etc., and shall be dry.

Whenever a prime coat is applied to the surface, no bituminous material shall be applied until the prime coat has thoroughly cured (*vide* the relevant I.R.C. specification). The edges of the surface to be treated shall be defined by rope lines stretched in position.

#### 4.4. First Coat

4.4.1. **Application of bituminous material :** After the surface to be treated has been prepared as specified above, bituminous material heated to the temperatures appropriate to the type of binder and equipment used shall be sprayed uniformly over the dry surface preferably using mechanical sprayers. The rate of application shall be 17.0 to 19.5 kg per 10 m<sup>2</sup> for straight-run bitumen and 19.5 to 22 kg per 10 m<sup>2</sup> for cutbacks and road tars.

Excessive deposits of bituminous material upon the road surface caused by stopping or starting the sprayer, by leaking or otherwise, shall be immediately removed.

4.4.2. **Application of cover material :** Immediately after the application of bituminous material, the cover material of 13.2 mm aggregate at the rate of 0.14 to 0.15 m<sup>3</sup> per 10 m<sup>2</sup> shall be spread uniformly by hand or preferably by means of a mechanical grit spreader so as to cover the surface completely.

While rolling, the surface shall be broomed with a view to ensure uniform spreading of aggregate.

4.4.3. **Rolling :** Immediately after the application of the cover material as described in para 4.4.2, the entire surface shall be rolled with a 6 to 8 ton road roller. The rolling shall begin at the edge and proceed length-wise over the area to be rolled lapping not less than one third of the roller tread and proceed towards the centre. When the centre is reached, the rolling shall then start at the opposite side and again proceed towards the centre. In the super-elevated portions, the rolling shall proceed from the inner edge to the outer edge. While the rolling is in progress, additional aggregate shall be spread by hand in whatever quantities may be required to fill irregularities and to prevent picking up of aggregate by the roller. Rolling shall be continued until all grit particles are firmly embedded in the binder and present a uniform closed surface. Excessive rolling, resulting in the crushing of aggregate, shall be avoided.

#### 4.5. Second Coat

4.5.1. **Time interval :** The second coat of surface dressing shall be applied either immediately after the laying of first coat or soon after depending on the conditions at site and the type of binder used. Where road tar is being used as binder, the second coat should be done immediately after the first coat is laid.

4.5.2. **Application of binder for the second coat :** Prior to the application of second coat of binder, the surface shall be cleaned as described in para 4.3 and loose material and foreign matter removed. After getting the surface irregularities corrected and the surface trued to camber and gradient, a second application of hot binder heated to the appropriate temperature shall be uniformly sprayed preferably with a mechanical sprayer at the

rate of 9.8 to 12.2 kg per 10 m<sup>2</sup> in the case of straight-run bitumen and 12.2 to 14.6 kg per 10 m<sup>2</sup> in the case of cutbacks and road tars.

**4.5.3. Application of cover material :** Immediately after application of the binder, cover material of 11.2 mm aggregate 0.09 to 0.11 m<sup>3</sup> per 10 m<sup>2</sup> shall be spread uniformly by hand or preferably by means of a mechanical grit spreader so as to cover the surface completely.

While rolling, the surface shall be broomed with a view to ensure uniform spreading of aggregate.

**4.5.4. Rolling :** Soon after the aggregate is spread uniformly, rolling with a 6 to 8 ton road roller shall be done in the same manner as described in para 4.4.3.

#### **4.6. Finishing**

The finished surface shall be uniform and conform to the lines, grades and typical cross sections specified. When tested with a template and straight edge, the finished surface shall show no variation greater than 6 mm over a 3 m length.

#### **4.7. Opening to Traffic**

Where straight-run bitumen or road tar is used as the binder, the finished surface shall be thrown open to traffic on the following day; but if, in special circumstances, the road is required to be opened to traffic immediately after rolling, the speed of traffic shall be limited to 16 kilometres per hour till the following day.

Where cutback bitumen is used, the finished surface shall be closed to traffic until it has sufficiently cured to hold the cover aggregate in place.

Controlling of traffic shall be done by some suitable device, such as barricading and posting of watchmen, etc., consistent with safety.

#### **4.8. Wet Aggregate**

Appropriate specification of the Indian Roads Congress for the wet aggregate process may be referred to.